“I feel stupid I can’t delete...”
A Study of Users’ Cloud Deletion Practices and Coping Strategies

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Motivation

• Data management is an important aspect of our lives
• We create, modify and delete data
• Data management has moved to the cloud

Image source: science.slashdot.org

Image source: www.exceltip.com
Motivation

More recently,

• Deletion has been on the news (Dropbox, Apple)
Study goal

“To understand cloud users deletion practices and coping strategies”
Research Questions

Motivations

Deletion success/failures

Coping Strategies

Deletion wants

What motivates cloud users to delete?
Can they delete successfully?
If not, why can they not delete?
What strategies do they adopt to address their challenges?
What are the consequences of employing such strategies with regards to why they want to delete?
What do they want with regards to deletion?
Methodology

• **Qualitative approach**
  – Grounded Theory
  – Online survey
  – Sampling
  – Audio recorded interview sessions (30 – 45 min)
    • Semi structured
    • 2 deletion scenarios
  – Analysis
    • Transcriptions
    • 2 researchers - Iterative Coding (Initial coding, Axial coding, Selective coding)
    • Identifying patterns and relationships
Results

- Motivations to delete
- What causes failures
- Coping strategies
- Users’ desires
- Summary
Results (What makes users delete?)

- Privacy Driven
- Storage Driven
- Expertise Driven
- Policy Driven
Results (What makes users delete?)

“I have interviews with children, so I send recordings of interviews with children [to my transcriber] so just to be on the safe side once she receives everything, I delete everything” P4

- Lack of trust in the Provider
- Avoid future conflicts
- To forget
Results (What makes users delete?)

“I have interviews with children, so I send recordings of interviews with children [to my transcriber] so just to be on the safe side once she receives everything, I delete everything” P4

“I didn’t have a lot of space so I had to take out some pictures and videos so I deleted them from iCloud.” P16

- Lack of trust in the Provider
- Avoid future conflicts
- To forget

- Storage size
- Tidying up
Results (What makes users delete?)

“I have interviews with children, so I send recordings of interviews with children [to my transcriber] so just to be on the safe side once she receives everything, I delete everything.” P4

“I didn't have a lot of space so I had to take out some pictures and videos so I deleted them from iCloud.” P16

“I use [Box] because it was recommended and we were told that we couldn't store research work on Dropbox... Sometimes I use Dropbox most people use it, but if I use Dropbox I delete...” P9
Results (What makes users delete?)

“I have interviews with children, so I send recordings of interviews with children [to my transcriber] so just to be on the safe side once she receives everything, I delete everything” P4

“When I first found out I had it I tried to delete all the photos because I got scared... I got really confused when I first opened it because I was like well how did these files end up here? I never put them there...” P18

“I didn’t have a lot of space so I had to take out some pictures and videos so I deleted them from iCloud.” P16

“I use [Box] because it was recommended and we were told that we couldn’t store research work on Dropbox... Sometimes I use Dropbox most people use it, but if I use Dropbox I delete...” P9
Results (What causes deletion failures?)

- Insufficient Information
- Incomplete Mental Models
- User Interface Issues
Results (What causes deletion failures?)

**Insufficient Information**

- Information on deletion hard to find
- Terms and conditions long to read
- Deletion messages difficult to understand
- Insufficient information leads to lack of understanding on deletion

“Nothing like that is made very clear when you sign up... there's nothing obvious that I've come across anyway that says, 'After this amount of period of time this will actually be deleted.' So, surely that should be one of the first things that they tell people.” P19

“Sometimes on iCloud it does not allow you to delete, like if you are trying to delete something it says that if you delete it will mess up everything else, but on Google Drive and on Dropbox, I've never found anything like that. On iCloud sometimes it does not allow you to delete some stuff.” P24
Results (What causes deletion failures?)

Mental Models

- Identified 8 mental models that leads to failure to delete
- Mostly from the misunderstanding of the following:
  - Sync folder
  - Retention period
  - Levels of deletion
  - Deleted folder
Results (What causes deletion failures?)

Mental Models

Popular Models
- Saving and deleting work the same way
- Deletion is permanent and instant
- Sync folders are not the cloud
- The cloud within an app
- Borrowed deletion models
- Shared folder: Deletion is one sided

Unpopular Models
- Shared folder: Deletion affects all members
- Providers don’t delete
Results (What causes deletion failures?)

User Interface Issues

- Poorly designed interfaces
- Deletion process difficult to understand (e.g., Deleting from a mobile App)
- Small screens, Interface type (Mobile, Web App or Computer app)
- Effort required to delete
- Buggy software

“often with mobiles these days if the camera goes off in your pocket..., you can end up with all these blank photographs. Of course they go into OneDrive, so you look at your OneDrive and you want to clear all that. But sometimes it can take ages..” P23
Results (Coping Strategies)

- Head in the sand
- Ad hoc strategies
- Cloud hopping
- Excluding certain files from the cloud
- Deleting a different file
- Seeking help
- Deleting from one device
Results (Coping Strategies)

"If it’s not something important... I just leave it there... What can I do?” P2
Results (Coping Strategies)

Coping Strategies

- Head in the sand
- Cloud hopping
- Excluding certain files from the cloud
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- Seeking help
- Deleting a different file

Ad hoc strategies

“...that’s why I stopped using iCloud... I now use G-Drive... I know how to delete from G-Drive” P10
Results (Coping Strategies)

Coping Strategies:
- Head in the sand
- Cloud hopping
- Excluding certain files from the cloud
- Deleting a different file
- Seeking help
- Deleting from one device
- Ad hoc strategies

“If it is sensitive, I use my flash drive..” P17
Results (Coping Strategies)

Ad hoc strategies

Cloud hopping

Excluding certain files from the cloud

Deleting from one device

Seeking help

Deleting a different file

Head in the sand

Coping Strategies

“I have the app on my phone but I rarely use it, my app... I mostly delete from the desktop because I found it difficult to delete it on the phone.” P13
Results (Coping Strategies)

Coping Strategies

- Head in the sand
- Cloud hopping
- Excluding certain files from the cloud
- Deleting from one device
- Seeking help
- Deleting a different file

"If its not something personal... I ask my friends to help me” P12
Results (Coping Strategies)

“\textit{I will not delete that one, I will try to find something else to delete instead of it, to get more space otherwise I can't. So, at times I will remove a different file because I have not [yet] found a correct solution on how to get over it.}” P24
Results (Coping Strategies)

- **Head in the sand**
- **Cloud hopping**
- **Excluding certain files from the cloud**
- **Deleting from one device**
- **Seeking help**
- **Deleting a different file**
- **Ad hoc strategies**

"I have tried deleting from iCloud before but I failed... Nowadays I just buy more storage" P20

"... sometimes when I delete from my phone, it doesn’t actually delete on my Laptop. I have to go back to my Laptop to delete it if I wanted to.” P10
Results (What do users want?)

- Information on deletion should be clear
- Notification when data is completely deleted
- Deletion should be complete
- Recovery should be part of deletion
- Help desk for deleting data
- Automatic sync should be easy.
Summary

Motivations for deletion

- Expertise Driven
- Privacy Driven
- Storage Driven
- Policy Driven

Causes of failures

- Interface Issues
- Mental Models
- Deletion information

Coping Strategies

- Deleting from a single device
- Head in the sand
- Excluding files
- Seek help
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- Ad hoc Strategies

Can user delete?

- Yes
- No

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## Summary

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- Deletion information
- Mental Models
- Causes of failures

**Coping Strategies**
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- Seek help
- Head in the sand
Takeaways

• Deletion policies should be transparent
• Deletion information should be clear and easily accessible
• Improving interface feedback can improve weak mental models and avoid mistakes
• Customized education on deletion can help mature weak mental models
Thank You

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